

High-Efficiency Reliable Stirling Generator for Space Exploration Missions, Phase I

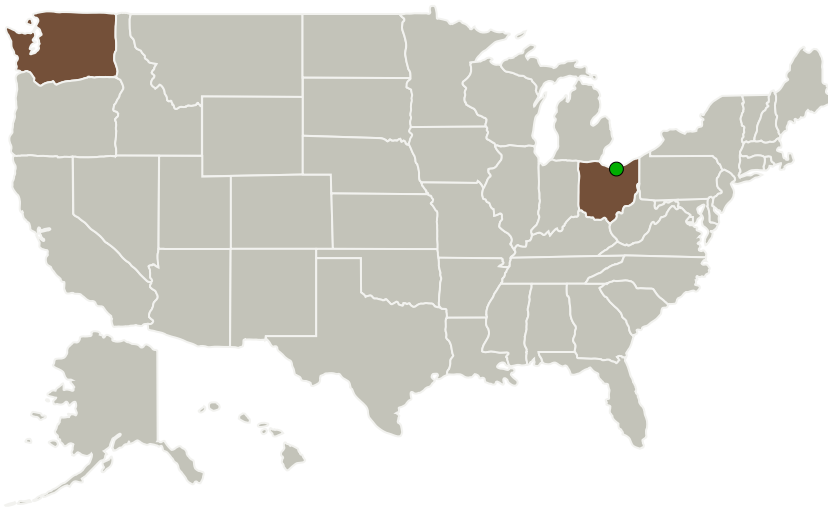
Completed Technology Project (2011 - 2011)



Project Introduction

NASA needs advanced power-conversion technologies to improve the efficiency and reliability of power conversion for space exploration missions. We propose to develop a Stirling generator to meet NASA needs. Our Stirling generator adapts technology we have developed for high-reliability long-life (> 10 years) space-based Stirling-cycle cryocoolers and proprietary compressor and expander technology. Our compressor and expander technology enables near-isothermal compressions and expansions, which allow our Stirling generator to achieve a high percentage of the Carnot thermal efficiency. In Phase I, we will generate a preliminary design of our Stirling generator and project its efficiency. In Phase II, we will build and demonstrate a prototype Stirling generator and deliver the prototype to NASA for functional and environmental testing. In Phase III, we will build and sell Stirling generators for many government and private-sector applications.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Beck Engineering, Inc.	Lead Organization	Industry	Port Orchard, Washington
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



High-Efficiency Reliable Stirling Generator for Space Exploration Missions, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

High-Efficiency Reliable Stirling Generator for Space Exploration Missions, Phase I

Completed Technology Project (2011 - 2011)



Primary U.S. Work Locations

Ohio

Washington

Project Transitions

 **February 2011:** Project Start

 **September 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138255>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Beck Engineering, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

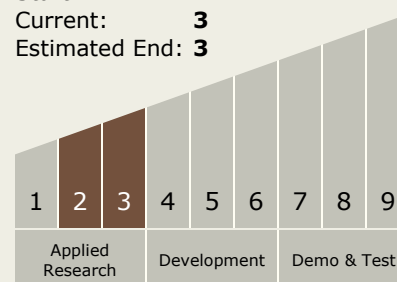
Douglas S Beck

Technology Maturity (TRL)

Start: 2

Current: 3

Estimated End: 3



High-Efficiency Reliable Stirling Generator for Space Exploration Missions, Phase I

Completed Technology Project (2011 - 2011)



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.3 Electrical Power Conversion and Regulation

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System